

## Section II. Gathering and Presenting Data for a Shoreline Survey

### A. Using the Basic Survey for Gathering Data:

This section will help volunteers understand the intent behind questions on the data sheet. Feel free to change the questions and the format to lead to best protection for your river. In this section, the Data Sheets are on the right hand pages (Figure 7) and the explanations are on the left hand pages.

### Instream Conditions

These questions will help you determine the health of the streambed and its water.

#### STREAM BOTTOM:

1-2 **Composition and Color:** Composition can indicate the health of the stream for habitat. Depending upon species, fish need different bottom substrate--from gravel to firm sandy bottoms. River bottoms have different characteristics depending upon their geology. Rivers with a higher gradient (steeper slopes) will have a number of larger sized rocks; flat meandering rivers will have finer grained bottom material. Sand is an important indicator. In many cases, sand occurs naturally; however, much of the sand in our rivers is sediment from construction and road runoff. Sand and silt smother fish spawning areas, fill pools and bind toxics and poisons. Excessive amounts of sediment should be noted on the map and in your summary. Orange to red stains results from bacterial action upon iron and may indicate erosion or industrial pollution. Note the color you see.

#### WATER:

3-5. **Color and Odor:** Healthy streams can be clear or they can be brownish (tea color) due to tannic acid from wetlands. A muddy or cloudy stream can indicate sediment or suspended solids from a wastewater treatment plant or polluted stormwater runoff. Milky sections, often accompanied by sewage-odor, a musky or rotten egg smell, indicate an illegal hookup or a leaking septic system, a major source of *nonpoint source pollution*. Oily sheen can indicate either natural decay of organic material along marshes or polluted runoff from roads and parking lots; another form of *nonpoint source pollution*. If the sheen is extensive and appears to be a spill, report it to the Fire Department or Board of Health. Foam can be naturally occurring and can be identified by its brownish color and because it breaks up easily. Foam from non-natural causes (human overuse of phosphates from wastewater treatment plants or from activities such as car washing) is very white or bluish and does not break up easily. Fishy smells may indicate that there has been a fish kill.

6-8. **Flow:** It is important to correlate the flow of the river to different seasons, or to changing but natural conditions such as rainfall or drought conditions. In contrast, some river levels vary and may be lower because of withdrawals and diversions. By keeping a record, you will get to know seasonal changes and unusual conditions. You will have important information to share with officials when the new Water Management permits for water withdrawals are made. Under the Water Management Act, the DEP issues permits for withdrawals of over 100,000 gallons per day for uses such as public water supply wells, agriculture (irrigation), and business needs.

9-10. **Pools, riffles and snags:** These are important for fish because they provide habitat, resting areas, feeding areas and cover.

#### VEGETATION:

11-12. **Excessive vegetation:** Excessive numbers of plants or algae in the water indicate excess nutrients from human actions. This too indicates *nonpoint source pollution*. Areas of excessive vegetation should be marked on the map and noted in your summary section under water quality.

13. **Wetlands.** Healthy wetlands are free of invasive plants such as phragmites and purple loosestrife, do not contain fill, do not have ditches draining the water, do not have pipes discharging material, and are not filled with trash. If you have wetlands in your section please note whether you consider them healthy or not. If degraded, please circle the reasons that they are degraded. If you have a large amount of degraded wetlands, you may want to conduct a Wetlands Survey and work with your Conservation Commission and/or the Wetlands Banking and Restoration Program.

## Figure 7: Shoreline Survey Field Data Sheets

Segment number: \_\_\_\_\_

Segment begins: \_\_\_\_\_

Segment ends: \_\_\_\_\_

Date: _____
Observers: _____
Today's weather: _____
Weather over past 24 -48 hours: _____

If you take photographs, mark the location on the map, and write it on the backs of the photos, along with date. Be specific (reference nearby road or house), so that people can compare later photos

### INSTREAM CONDITIONS

#### Stream bottom

1. What is stream bottom made of? (mark from 1=most typical to 6=least typical)

\_\_\_\_ Organic debris (leaves, twigs)

\_\_\_\_ Gravel (1/4 - 2")

\_\_\_\_ Silt (mud)

\_\_\_\_ Cobbles (2 -10')

\_\_\_\_ Sand (1/16 to 1/4")

\_\_\_\_ Boulders (> 10")

2. What color is the stream bottom? (circle one)

Black

Brown

Orange/Red

Yellow

Sandy

Gray

Other

#### Water

3. What color is the water? (circle) Cloudy    Tea    Milky    Muddy    Other \_\_\_\_\_

4. What is the water odor? (circle) None    Rotten eggs    Musky    Fishy    Oily    Ammonia    Other

5. Problem areas. (checkmark, describe location and cause, if apparent. \*Locate on map.)

\_\_\_\_ Oily sheen or smell \_\_\_\_\_

\_\_\_\_ Sewage: smell, milky color, toilet paper \_\_\_\_\_

\_\_\_\_ Foam or scum (describe. Does a stick break it up?) \_\_\_\_\_

\_\_\_\_ Fishy odor or fish kill \_\_\_\_\_

\_\_\_\_ Floating garbage \_\_\_\_\_

6. How deep is the water? (circle)    Less than 1'    More than 1'    More than 2'    More than 3'

7. How does the water level compare to normal for this time of year? (circle)

Normal

Higher

Lower

Don't know

If very high or low, can you tell why?

8. Is the water flowing (circle)    Quickly    Slightly    Almost still

9. Number of pools    Number of riffles    Don't know

10. Is stream flow blocked by...(circle and \*locate on map.)    Trees    Trash    Large objects

#### Vegetation

11. Are there areas of extremely dense or clogging aquatic vegetation in any section? (circle) Yes    No

\*If yes, locate on map and describe cause, if obvious. \_\_\_\_\_

Species, if known (circle)    Duckweed    Water chestnut    Other \_\_\_\_\_

12. Are there areas covered with algae? (Circle) Streambed    Around pipes

If algae seems abnormally heavy, \*locate on map. Draw in extent of algae on map.

13. Are there wetlands? (Circle. \*locate on map.)    Yes    No    If yes, are they degraded by... (circle)

Phragmites

Purple Loosestrife

Fill

Blockages

Ditches

Sediment

Disturbed banks

Pipes

Trash

Other \_\_\_\_\_

## Stream Corridor Conditions

### Riparian Area and Land Use

14-15. Overhanging trees and shrubs are important for providing shade and keeping the stream cooler. Cooler temperatures mean the stream can hold more oxygen. Shoreline vegetation is also essential for habitat for both fish and wildlife in the corridor. Vegetation can prevent erosion, sedimentation and polluted runoff from reaching the stream. The condition of the bank is directly related to the health of the river.

16-17. Vegetated areas beyond the stream bank provide additional buffers to polluted runoff and can capture sediment and other materials before they wash in to the stream. These areas also provide shelter and habitat for many terrestrial animals who come to feed along the stream. They provide corridors between upland and aquatic environments. The width of these areas is important because certain animals require specific distances for their habitat needs. Larger vegetated areas will also offer better protection from polluted runoff.

18. **FILL:** It is important to identify fill because it interferes with habitat and the ecology of the stream flow. Fill in wetlands and in areas adjacent to rivers is particularly damaging. Fill within 100 feet of the stream bank or wetlands falls under jurisdiction of the Conservation Commission. If you see new fill or brush piles, mark them on your maps. If you notice clear cutting, or removal of all the trees in an area adjacent to the river, mark it down on your sheets and map.

19. **LAND USE:** Because land use affects the health of the river, it is important to document the major land uses in your river segment. The amount of impervious surface in a watershed is directly related to the health of your river. Note if lawns or parking lots are buffered by natural vegetation along the river to protect the river from nutrients and provide habitat, or if they go to the waters edge. Note new construction sites near the shore and see if there are erosion and sedimentation controls in place. Write down signs of erosion including muddy water, sediment deposits or undercut banks.

20. **RUNOFF:** Sixty percent of the rivers surveyed in Massachusetts fail to meet mandated water quality standards. Eighty-nine percent of those rivers fail because of polluted runoff, *nonpoint source pollution*.

**PIPES:** Storm drain pipes bring to rivers runoff from roads, parking lots, houses, leaking septic systems, lawns and gardens. In other words, storm drain pipes discharge *nonpoint source pollution* to our rivers from many of our land uses. In addition, illegal drain pipes bring gray water from houses and chlorinated water from swimming pools. It is particularly important to note flows from pipes in dry weather. These flows may indicate illegal hookups. Note the color of the discharge; estimate the diameter of the pipe and the amount of the flow. Do not touch the flow; it may be contaminated. Mark the locations on your maps and, if possible, take pictures of them. If you know that your river has many pipes, you may want to do a separate pipe survey. Included in this manual is a pipe survey sheet and instructions.

**LITTER AND TRASH:** Litter and trash often get hung up on snags in the river. Note the amount of trash, its type (paper, plastic, tires, shopping carts, refrigerators, cars!) and describe potential clean up areas. Groups often work not only to clean up the trash, but also work to stop future trash by educating the public and nearby businesses and stores.

**POTENTIAL OPEN SPACE:** Locate areas that should be protected for habitat or water quality, and that would provide open space resources.

21-22. **RECREATION:** Note any official public access points on the river for recreation. There may also be some unofficial access points which people enjoy using. Some of these need to be formalized and protected. You may want to talk with your Conservation Commission or Land Trust about ways to protect these sites.

## STREAM CORRIDOR CONDITIONS

### Riparian Area and Land Use

14. Do trees and shrubs overhang the stream and provide shade? (circle) Yes No  
If yes, estimate what percentage of the bank is shaded

15. What are the stream bank conditions? (*circle. Put a star\* next to the most common.*)

Left Bank: (Looking downstream) (If doing only one bank, indicate which one)

Eroding Moss Trees/Shrubs Exposed Roots Grass/Flowers Loosestrife/Phragmites  
Beaches Riprap/channelized Shrubs/brambles Wetlands/marsh

Right Bank: Eroding Moss Trees/Shrubs Exposed Roots Grass/Flowers Loosestrife/Phragmites  
Beaches Riprap/channelized Shrubs/brambles Wetlands/marsh

16. Is there a vegetated riparian area beyond the stream bank? If yes, indicate condition.

(*circle. Put a star\*next to the most common.*)

Left Bank: Shrubs/grasses mowed pasture/meadow Forested/trees Park with few trees Lawn

Right Bank: Shrubs/grasses mowed pasture/meadow Forested/trees Park with few trees Lawn

If area is not vegetated, please describe condition: (i.e. parking lot, pavement, roadway, buildings)

Left Bank: \_\_\_\_\_

Right Bank: \_\_\_\_\_

17. If the riparian area is forested or in shrubs and grasses, estimate width of the vegetated area (to a lawn, road, or other change in land use) left bank \_\_\_\_\_ right bank \_\_\_\_\_

18. Are there places that have fill or clear-cutting? (*circle*) Yes No  
If yes, mark locations on map as fill F1, F2, F3. Etc (or clear-cutting CC1 CC2, CC3, etc).

19. What are the land uses visible from the river? (*checkmark and circle the dominant land use type.*)

<input type="checkbox"/> Industrial	<input type="checkbox"/> Parking lots	<input type="checkbox"/> Golf courses
<input type="checkbox"/> Commercial	<input type="checkbox"/> Roads	<input type="checkbox"/> Protected/conservation land
<input type="checkbox"/> Agricultural	<input type="checkbox"/> Landfills	<input type="checkbox"/> Undeveloped/unprotected land
<input type="checkbox"/> Residential	<input type="checkbox"/> Railroads	<input type="checkbox"/> Wastewater treatment plants
<input type="checkbox"/> Park/ ballfields	<input type="checkbox"/> Junkyards	<input type="checkbox"/> Wooded areas <input type="checkbox"/> Other ( <i>describe</i> )

20. Do you see runoff from any of the following? (*circle. \*If run-off is significant locate on map.*)

Manure	Pet / goose droppings	Parking lots	Sewage	Roads
Bridges	Construction	Plowed fields	Lawns	Other _____

**Pipes:** Please fill out separate pipe survey and mark locations on map as P1, P2, P3, etc.

**Trash:** Describe any potential cleanup areas. *\*Locate on map.*

**Potential Open Space:** *Describe and locate on map:* \_\_\_\_\_.

### Recreation

21. Is there designated public access to the stream? Is it appropriate for... (*circle and \*locate on map.*)

Canoeing Fishing Swimming Walking Bicycling Other \_\_\_\_\_

22. Are there areas which are informal or potential access points? No Yes- *Describe and \*locate on map.*

## **Wildlife**

### **Aquatic Habitat/Species:**

In addition to noticing aquatic life as you answer the Survey questions, ask anglers for their observations and include them.

23-24. Describe any fish that you see or evidence of fish such as nests or other features in the river. Also note any evidence you see of other aquatic life such as tracks or eggs. Look for aquatic insects flying around the stream, turtles basking on logs, or shellfish in the mud. The wildlife you see and hear may be dependent on the time of day. Return to the stream in the late afternoon or dusk to listen for frogs or other animals.

25. There may be habitat elements in the stream that indicate places that would provide good habitat for aquatic species such as pools and riffles, gravel stream bottom for spawning, rocks and boulders for hatching insect larvae, vegetation or trees.

### **Riparian Habitat/Species:**

26-28. Look and listen for animals that use the riparian area for shelter and feeding. These could include muskrats, beavers, raccoons, squirrels, snakes, deer, moose, bear, fox or other type of mammal, bird or reptile. Look for evidence of these animals by their marks on trees, tracks or scratching on the ground, dens, nests or holes, or areas of eating or scat (droppings). Also look for habitat elements that these animals could use such as dead trees or rock walls.

29. To learn if there are rare or endangered or state listed species along your river see the copies of Estimated Habitat Maps of rare state listed wetlands wildlife published by the Natural Heritage Program. These maps, which can be found in your Conservation Commission office, show roughly where rare and endangered species exist. If you find evidence of rare and endangered species, you will want to photograph them and use forms from the Natural Heritage Program to document them for the state. Forms can be obtained from the Natural Heritage Program, DFW, 251 Causeway St., Boston, MA 02114. Documentation may offer extra protection.

30. Links to other areas of wildlife habitat are important for animals that travel to and from the riparian area. Many animals use the riparian area for part of their life cycle, but must travel to other upland areas as well. Species such as deer take advantage of the edges of wooded areas and open pasture for feeding and shelter. The habitat will be healthier when there are more connections available between open areas.

## WILDLIFE / HABITAT

### Aquatic Habitat/Species

23. Do you see fish or evidence of fish? (describe) \_\_\_\_\_  
Estimate number \_\_\_\_\_. *If possible, describe species & size.* \_\_\_\_\_  
Evidence of fish? (i.e. nests) \_\_\_\_\_
24. Other forms of aquatic life? (*circle, identify species if known*)  
Aquatic insects   Turtles   Frogs   Salamander   Snail   Mussels   Snakes   Clams  
Other \_\_\_\_\_  
Evidence of aquatic species? (i.e. eggs, tracks) \_\_\_\_\_
25. Wildlife and fish habitat elements present in water (*check*)  
\_\_\_ Pools and riffles in stream  
\_\_\_ Gravel stream bottom  
\_\_\_ Rocks and boulders in stream  
\_\_\_ Emergent aquatic vegetation  
\_\_\_ Vegetation hanging over the banks and water  
\_\_\_ Fallen trees in water

### Riparian Habitat/Species (look along stream bank and vegetated riparian areas)

26. Animals or evidence of animals? (*circle*)  
Holes   Teeth marks   Food storage/eating   Dens   Scat   Footprints/tracks  
Specific animals seen (or evidence of) \_\_\_\_\_
27. Wildlife habitat elements located near the stream (*check*)  
\_\_\_ Standing dead trees  
\_\_\_ Fallen tree limbs and trunks  
\_\_\_ Scattered rocks and boulders  
\_\_\_ Stone walls (without cement)  
\_\_\_ Vines  
\_\_\_ Springs and seeps  
\_\_\_ Vernal pools
28. Birds? (*circle*)   Herons   Mallard ducks   Wood ducks   Kingfishers   Canada geese   Other \_\_\_\_\_  
Evidence of birds: (i.e. nests, footprints) \_\_\_\_\_
29. Do you know if there are rare & endangered species of plants or animals in your segment? *If so, identify.*  
\_\_\_\_\_
30. Links from riparian area to other areas of wildlife habitat: (*check*)  
\_\_\_ Wetlands adjacent to stream  
\_\_\_ Abandoned cropland or pasture near stream  
\_\_\_ The riparian area is vegetated with trees and/or shrubs at least 100 feet wide  
\_\_\_ The riparian area connects to adjacent open space or greenway

### Figure8: Shoreline Survey Summary Sheets

The summary sheets are designed to give a "big picture" of your segment. They provide the basis of the narrative description of segments in the Shoreline Survey Report.



### Shoreline Survey Summary Sheet

Segment begins: \_\_\_\_\_

Segment ends: \_\_\_\_\_

Date: _____
Observers: _____
Today's weather: _____
Weather over past 24 -48 hours: _____

*These sheets are designed to give the "big picture" of your segment. They provide the basis of the narrative description of segments in the Shoreline Survey report.*

### NARRATIVE DESCRIPTION

SAMPLE 1: The river flows slowly through this segment. The banks on the south side are eroded for a distance of about 100 yards (a football field), with parkland behind it. On the other side of the river, the banks have cement walls, industrial buildings and parking lots. There was a marsh at the lower end. A small stream came into the river, and the water quality seemed worse after it entered. Bits of oil floated on the water, and the stream smelled like asphalt. There were a few gulls in the industrial section, and there were turtles, a muskrat hole and a great blue heron in the wetland/marsh.

SAMPLE 2: Segment 2 flows quickly through conservation land, with several small riffles. We saw several anglers along the banks. There were many downed trees in the stream, which provide good habitat for fish. Vegetation along the stream is thick, second-growth forest with an old dirt road providing good access for walking or mountain biking. There are several old appliances in the river near the Rt. 20 bridge.

*Describe your segment in a paragraph:*



## B. Conducting a Pipe Survey

The purpose of the Pipe Survey is to learn if storm drains and pipes are flowing in dry weather. Because storm drains are designed to bring storm water to the river, they should flow only during and just after a storm event. If they are flowing during dry weather, they may be bringing pollutants to the river. Some of the sources of these pollutants could be leaking septic systems or illegal hook ups. It is therefore very important for groups to answer questions about weather conditions on both these data sheets as well as on the basic Shoreline Survey Field Data Sheets.

Some groups do a Pipe Survey as part of their basic Shoreline Survey; other groups find that there are too many things to record to combine the two surveys. They do pipe surveys separately.

To conduct a shoreline Pipe Survey, groups walk along the river where it is accessible, drive to roads or parking lots that abut the river or tributaries. Bridges are a good location to look for pipes that are street drains but which may also have illegal tie ins or groundwater infiltration.

**CAUTION:** Do not cross private property without permission. Do not touch the liquid coming out of the pipe. Do not put your head or hands inside the pipe

Filling out the Pipe Survey Forms (see *Figure 9*. The first row has been filled in as an example. For sample pipe survey map, see *Figure 1A*.)

**Pipe #:** Write your numbers chronologically beginning with # 1. For a long stretch or one with many pipes, you may need to photocopy more than one sheet per section.

**Date:** Fill in the date you did the Shoreline Survey.

**Time:** Write the time you checked each pipe.

**Weather today:** Describe if the weather is sunny or overcast. Include the air temperature and, if possible, the water temperature.

**Weather in last 48 hours:** Describe the weather in terms of last rainfall.

**Pipe material:** Describe the material as best you can (concrete, plastic or metal.) If the pipe is cracked, corroded, or discolored mention this too.

**Pipe size and amount of flow.** Indicate the pipe diameter either by measuring through the center or estimate if measuring is not possible. Indicate amount of flow by drawing the water level in the pipe and describe whether the flow was roaring, moderate, a trickle or dripping.

**Color of flow:** Describe the color as best you can. Color can be clear, clear with a sheen, rusty brown color, reddish brown, green or whitish. If the material is very solid or has particles in it, you may want to indicate this here.

**Odor:** Describe the odor as best you can. Odor can range from no odor, to dank and musky, strong musky, fetid (rotting), urine, sewage, to chemical (acid).

**Comments:** Note what the pipe seems to be used for. It may be a storm drain (a device for taking rain water from parking lots and roads.) The pipe could be a hose from a house or a swimming pool. If you think the pipe is one that should be monitored further or requires action, write those comments in this column.

If possible, return to drain pipes under different conditions: different times of day, different days of the week, different weather conditions, to see when they are discharging.

**ABOVE ALL, BE CAREFUL. ALTHOUGH THE WORK YOU WILL BE DOING IS VERY IMPORTANT AND MUST BE ACCURATE, YOU SHOULD BE AWARE THAT AS VOLUNTEERS ANY ACCIDENTS THAT RESULT ARE ONLY COVERED BY YOUR OWN INSURANCE--USE CARE AND COMMON SENSE.**



**Figure 9: Adopt-A-Stream Pipe Survey of \_\_\_\_\_ River/Brook**

Segment # \_\_\_\_\_

Date: \_\_\_\_\_

Names of observers: \_\_\_\_\_

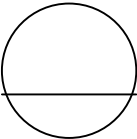
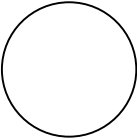
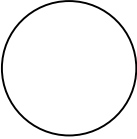
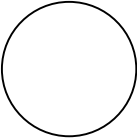
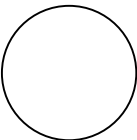
Weather today: \_\_\_\_\_

Weather over past 48-72 hours: \_\_\_\_\_

Segment Begins: \_\_\_\_\_

Segment Ends: \_\_\_\_\_



Pipe#	Time	Pipe material and condition	Pipe size & amount of flow	Color of Flow	Odor of Flow	Algae below pipe Yes No Describe extent	Sediment below pipe	Comments? If pipe should be rechecked-describe location	GPS Latitude GPS Longitude: (Optional)
Sample #1	9:33 AM	Concrete in good shape	 Constant Moderate Flow 1' diameter	Red-brown	fetid	Green growth coating rocks across the entire stream width and 100 yards upstream.	Sand accumulation at outfall	Should be rechecked. Downstream of Jones St. Bridge	
									
									
									
									

Massachusetts Riverways Programs/DFWELE 5

## C. Conducting a Bridge Survey

Bridges represent the intersection of human traffic and rivers. They are the most likely place for us to gain access to the stream. They are also likely places for stormwater to carry road and road maintenance impacts to the stream. You will need one data sheet for each bridge.

1. Access: You will want to identify existing access points on your map and know which ones are permanently marked and open to the public and which ones are dependent upon landowners whims. Having this data can allow your group to work to improve access. Your group may want to work with town officials, land trusts, and landowners to formalize access points. There are several ways to do this. In Norwood, MA, the town planner and the Neponset River Watershed Association recently celebrated the donation of a canoe access point from a local business. In Lincoln, the Conservation Commission has created canoe access with parking provided on conservation land. On publicly owned land, groups work with the Public Access Board to create public access. To get in touch with the Public Access Board and learn how you can work together, call Jack Sheppard, Director, Public Access Board (617-727-1843). Jack Sheppard and his staff can sometimes do site inspections to see if the area fits Public Access Board criteria. If the land is on State Highway Department land, work with the MA Highway Department and Public Access Board. For more information, call Russ Cohen (617-626-1543) at the Riverways Office.

2. Navigation: Information from these questions could be part of a future canoe guide. For example, you would learn which bridges required portaging for canoeists. If, and when the bridge needs repair or reconstruction, your data might help redesign the bridge for better navigation purposes. (See Appendix C for suggestions about protecting rivers during bridge construction.)

3. Road runoff: Sediment, and the accompanying toxics which bind to sediment, harms river ecology by burying habitat for aquatic organisms. Direct, untreated roadway discharge can silt in a stream and alter stream chemistry. By identifying serious problem areas (ones with a great deal of sediment, or areas which are prime habitat for fish or for aquatic insects), groups can work with town officials and DPWs. Some communities have created Best Management Practices such as (1) removing asphalt from the swales (at the least, your information could help prevent new asphalt swales from replacing vegetated ones); (2) allowing vegetation to help trap the sediment; and (3) building retention basins. Recently, the Jones River Watershed Association and the North and South Rivers Watershed Association received grants to build systems that infiltrate and treat stormwater at critical areas.

4. Effect on river channel: These questions look at how the bridge affects the river itself.

If the bridge is culverted (ie. the bottom of the stream surface is part of the bridge structure, or in other words, the stream is in a pipe or box), it can impair fish migration.

1) Long or steeply sloped culverts can impair migration by inland or anadromous fish.

2) Improperly sized culverts increase downstream velocity and scour downstream invertebrate and fish bottom habitats.

3) Some fish, alewives in particular, will not cross long, dark culverts.

4) In addition, flat culvert bottoms create shallow water which serve as barriers to inland fish species.

After floods, when backed-up water behind the bridge is released, it can scour out the stream bottom, create pools, and transport sediments downstream. This can be beneficial, creating a pool for habitat or fish, or detrimental, removing riffle areas that support aquatic insects. Degradation also occurs if the sediment from the scoured area is deposited in areas of good habitat or if the pool is undercutting the bridge. In noticing the differences in bottom composition above, under and downstream of the bridge, watch for deposits of sand, sand bars and fine silts. Look also for undercut banks.

5. Floating debris: Answers to these questions can become part of your data for determining if and where a clean up is needed.

6. Note other observations about the bridge: Is it in disrepair? Is it scenic? Is there signage identifying the river or brook? Or any miscellaneous observations you note.

**Figure 10. BRIDGE SURVEY DATA SHEETS**

Identify the Bridge by name or by naming the street or road. If the road crosses the river at several bridge crossings describe the neighborhood. \_\_\_\_\_.

1. Access: Is there river access? (Indicate yes or no with a "Y" or an "N")

- \_\_\_ Easy carry on access for canoes?
- \_\_\_ Fishing access?
- \_\_\_ Boat ramp for motorized boats?
- \_\_\_ Safe parking for cars? If yes, how many cars: \_\_\_\_\_
- \_\_\_ Posted "No Trespassing" signs?
- \_\_\_ Do you know who owns the land around the bridge? If yes, circle town, state, private owner. If you know, give the owner's name.
- \_\_\_ Potential for access? If so, indicate which uses by circling: (canoeing; fishing; motorized boats; parking for cars; parking for trailers)

2. Navigation: (Indicate yes or no with a "Y" or an "N")

- \_\_\_ Are the bridge pylons (bridge support structures) close together?
- \_\_\_ Would the current carry a boat into a bridge pylon or abutment?
- \_\_\_ Is there adequate clearance under the bridge for boats?
  - \_\_\_ During normal flows?
  - \_\_\_ Even during high water?

3. Road Runoff: Are there noticeable effects of road runoff? (indicate yes or no with a "Y" or "N".)

- \_\_\_ Does the road drain to the river by pipe, shoot or swale?

If so, describe the size and location of any pipes, shoots or swales:

- \_\_\_ Is there evidence of erosion caused by the drainage system?
- \_\_\_ Is there evidence of sediment being deposited below the drainage pipe?
  - If so, approximate the amount (in square feet)

4. Effect on river channel: Has the bridge had an impact on the river channel?

- \_\_\_ If the bridge is culverted, does it prevent fish or wildlife migration?
  - If so how:

- \_\_\_ Is there a pool just below the bridge?
- \_\_\_ Are there similar pools on the river which appear natural?
- \_\_\_ Is there a difference between the bottom composition upstream and downstream or under the bridge?
- \_\_\_ Has the river undercut any of the bridge abutments?

5. Floating debris:

- \_\_\_ Is there evidence of floating debris collected on the upstream side of the bridge?
- \_\_\_ Is the debris backing up flood water?

6. Other observations: Is it in disrepair? Is it scenic? Is there signage identifying the river or brook? Other comments?

Figure 11:

# Wetlands Survey Sheet

## Adopt-A-Stream Program and Wetlands Restoration and Banking Program

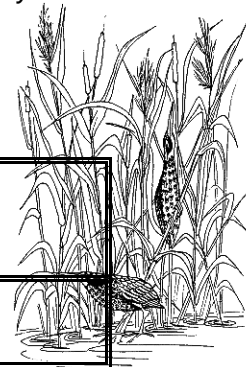
Observers: _____
Segment: _____ River Group Name: _____
Watershed: _____ Town: _____ Date: _____

- I. (Summary Question) Number of wetlands in your segment? \_\_\_\_\_ (Answer from map or at end of survey.)  
If there are several wetlands of the same type, combine your answers if you can. Some observers may need more than one survey sheet.

- II. Type of Wetland: (See Wetlands Primer, Appendix D)

- A. What type of wetland is it? (Please fill in box(es).)

<u>Inland</u>
a) Type: (Circle) Marsh; wet meadow; bog; shrub swamp; hardwood swamp; evergreen swamp
b) Dominant plants (if known):
<u>Tidal</u>
a) Type: (Circle) Salt/brackish marsh; Fresh water marsh



- B. What is the approximate size of the wetland? One football field equals approximately one acre.

(Circle) Less than 1 acre      1-5 acres      5-10 acres      10-50 acres      more than 50 acres.

- C. What is the overall condition of the wetland: (See Appendix E, Wetlands Primer)

(Circle) Excellent      Good      Fair      Poor      Degraded      Extremely degraded      Don't know.

- D. What are the land uses in the wetland area? (Circle) Industrial, commercial, agricultural, residential, golf course, landfill, marina, mooring area, protected open space, undeveloped, other.

- E. What is the dominant land use?

- F. Draw a plan of the wetland area showing features such as nearby streams, roads and other prominent reference points. Be sure to show the location of subject wetland and impact areas (fill, stormwater discharge pipe, ditch, or tide gate.)

- III. (Summary question) Are there wetland issues that should be included in your group's action plan?  
Fill out this question at the end of your survey.

Problems: Describe.
1. Can you suggest a remedy: (Circle) Reporting to Conservation Commission? Wetland Restoration & Banking Program? Purchase? Other? (See Appendix D, Wetland Primer)
2. Do you have any knowledge of the wetland's history, habitat, rare and endangered species, importance to river for flooding or water storage?

## WETLANDS SURVEY CONTINUED

IV.

Please fill out the wetlands matrix. Note that each question has several parts - horizontally.

<b>1. VEGETATION</b> 1a. Phragmites present? (Circle) Y N Estimate % wetland that has phragmites: (Circle to the nearest percentage) 5% 25% 50% 75% 100% Comments:	1b. Purple loosestrife present? (Circle) Y N Estimate % of wetland that has loosestrife: (Circle to nearest percentage) 5% 25% 50% 75% 100% Comments:	1c. Vegetation removal by cutting or by bulldozer or other means? (Circle) Y N Comments:	1d. Is the area mowed? (Circle) Y N Comments:	1e. Is the area grazed? (Circle) Y N Comments:	1f. Are wetland streambanks denuded? (Circle) Y N Comments:	1g. Other signs of wetland streambank disturbance? (Circle) Y N Describe:
<b>2. CHANGES IN WETLAND ELEVATIONS</b> 2a. Is there fill in the wetland? (Circle) Y N Is there fill on land adjacent to wetland? (Circle) Y N	2b. Type of fill: (Circle) trash, dirt, concrete/pavement, rocks, dredged material, other? _____	2c. Location of fill: (Circle) in wetland itself; along edge; in water.	2d. Is there a manmade berm or levee? (Circle) Y N	2e. Is there evidence of sediment deposits in wetlands? (Circle) Y N	2f and g. Additional remarks.	
<b>3. HYDROLOGY CHANGES</b> 3a. Are drainage ditches present in the wetland? (Circle) Y N Comments:	3b. Specify dimension of ditches: _____ width _____ depth	3c. Has the wetland been scooped out (excavated)? (Circle) Y N	3d. Evidence of dead or dying trees in water? (Circle) Y N How extensive?	3e. If tidal, is the flow restricted by a tide gate or other structure? (Circle) Y N Describe:	3f and g. Additional remarks:	
<b>4. WATER QUALITY DEGRADATION</b> 4a. Is there a stormwater discharge pipe entering the wetland? (Circle) Y N	4b. If there is a pipe, what is the material? _____ What are the dimensions? _____ Comments:	4c. If there is a pipe, is there a noticeable increase in sediment in the wetland near pipe? (Circle) Y N	4d. Describe the effects of the discharge:	4e. Is there evidence of oil or other pollutants in the wetland? (Circle) Y N Describe.	4f. Are wetland streambanks heavily eroding? (Circle) Y N	4g. Additional remarks:

V. Do you have any additional comments?

Please give a copy of this report to your team leader. In order to assist in a statewide inventory, please send a copy of the wetland survey to:  
 Christy Foote-Smith, Wetlands Restoration & Banking Program, Executive Office of Environmental Affairs, 251 Causeway St. Suite 900, Boston, MA 02114. Thank you!

